

U-space Together

FAST-TRACKING **DRONE** INTEGRATION IN A SAFE SKY

Based on experience gained in a real life environment, DSNA is a key-player in international major UTM initiatives.
DSNA and its partners are committed to building U-space, together with best class solutions for U-space services through a collaborative approach.

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DSNA

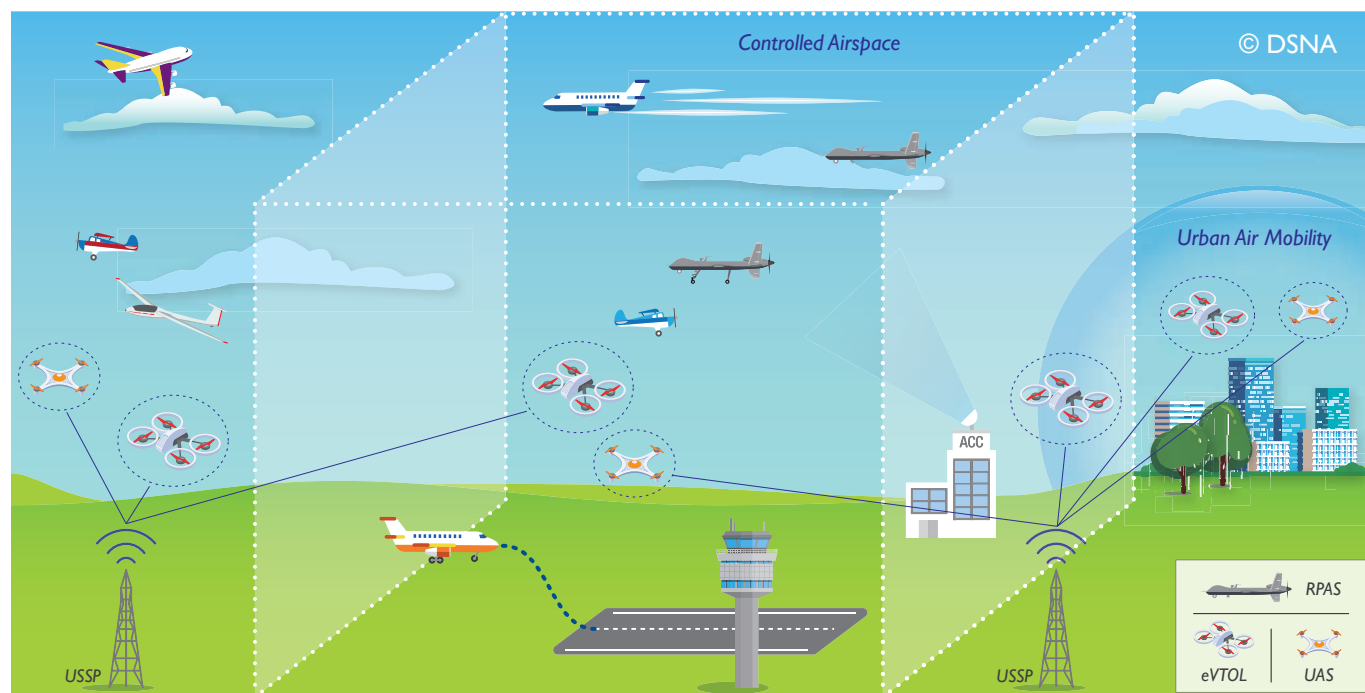
The increasing importance of drones in everyday life in Europe is a key challenge for any Air Navigation Service Provider (ANSP). These new unmanned flight operations have very varying flight performances and sectors of activity. There are two categories of drones:

- Remotely Piloted Aircraft System (RPAS), that will eventually fly in IFR up into the upper airspace
- Other drones (UAS, eVTOL), that fly mostly in the lower airspaces

In 2019, DSNA, the French Air Navigation Service Provider, handled 3.3 million IFR flights and almost 3 million VFR flights operated in French airspace. DSNA already supports thousands of drone flights operating yearly in one of the busiest airspaces in Europe. DSNA is committed to U-space implementation to support the traffic growth in the coming years.

OUR VISION

To create a safe, fair and efficient U-space for both manned and unmanned operations by a customer-centric approach.



OUR OBJECTIVES

- To enable integration of both manned and unmanned aircraft operations in a safe unsegregated sky
- Restricted airspace such as urban airspace shall be opened up to drone operations according to UAS airworthiness, risk assessment and social acceptance

OUR APPROACH

DSNA fully supports the drone industry by creating the best conditions to enable companies to innovate. DSNA brings its know-how including safety management as a core driver and collaborates with the Civil Drone Council, a strong industrial body.

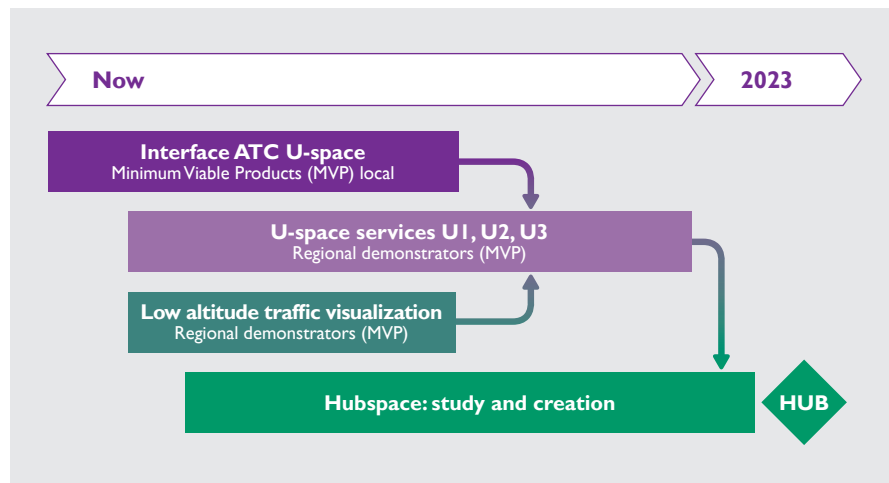
However, the uneven maturity of drone-based services, the number of UTM players, the number of business models and the diversity of economic and operational contexts in France call for an iterative and open approach.

Moreover, in 2018, DSNA launched a call for U-space partnerships to foster and structure U-space solutions that will:

- enhance management of drones within controlled airspace
- integrate RPAS operations into General Air Traffic
- meet the needs of safety, security and the economy in all categories of airspace in France

This 4-step program establishes long-term structured partnerships for the integration, testing and provision of U-space services in France. At the end of 2019, DSNA selected 11 civil partners using digital solutions to sup-

port pre-operational services at 12 sites in France. Experimentations will be carried out using Minimum Viable Product (MVP) solutions.



AT THE EUROPEAN LEVEL

DSNA is a very active player in the exploratory research projects of the SESAR program on U-space and UTM-related demonstrations. For instance, it participates in CORUS and USIS projects.

CORUS

Concept of Operations for euRopean Unmanned Systems

SESAR 2020 Project



This project has received funding from the SESAR Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement 763551.

Released in September 2019, CORUS Concept of Operations describes how very low-level (VLL) airspace should be organised and what rules and operational procedures should be put in place to enable the safe integration of drones with other users of this airspace. It also gives more details about U-space services that should be available to help the drone user to achieve this.

USIS

U-space Initial Services

SESAR 2020 Project



This project has received funding from the SESAR Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement 783261.

The objective was to demonstrate how users can access the airspace more easily and conduct their operations efficiently in a safe and secured airspace, thus conciliating the concerns of the authorities with the push of the market to conduct more and more UAV operations.

The project ended successfully, with an impressive validation open day.

WORKING IN PARTNERSHIPS SHAPING

SOFIA DRONE

Provision of Aeronautical Information Services (SOFIA)



DSNA has launched the Aeronautical Information Management (AIM) program to support the transformation of the supply of aeronautical information into digital form. The AIM program coordinates the various stakeholders to offer innovative services such as SOFIA-drone based on the SWIM concept developed in the SESAR program.

SOFIA-drone provides to drone operators, no-fly and restricted zones through web-services for visualization and for requesting data. In 2019, DSNA focused on improving the quality of the digital data provided for the populated areas.



View from ground control station.

In 2017, the first live trials led by DSNA and the French Air Force were conducted with a RPAS. Its performances were equivalent to those of light aircraft operating in civil aircraft operating into civil air traffic.

COUNTER UAV

Detection and management of non-cooperative UAV intrusions

Airports are locations for which safety and security are of utmost importance. DSNA is therefore actively addressing the risk of non-cooperative UAV intrusions entering the airport area and which may create major issues.

DSNA is collaborating with all other actors involved in the process to put in place measures adapted for the protection of airports and similar complex environments, involving national regulator, airport operators, national security, law enforcement, armed forces. This level of protection requires also a very high performing and sensitive system.

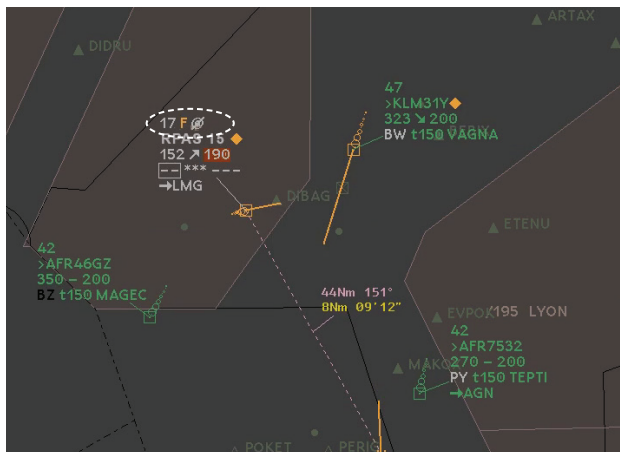
DSNA with Groupe ADP, and Thales have developed the **HOLOGARDE solution**: it integrates into a Command and Control System, holographic radars, direction finders, piloted cameras. The system provides high-level features for detection of drones intrusions, classification and decision-making. HOLOGARDE is in production and is being deployed at Paris-CDG airport after a successful experimental installation at the International Paris Air Show in June 2017, which saw the detection, tracking and identification of 131 test drones at a distance of 5 km during the week-long event.

SUPPORTING PIONEERING PROJECTS

THE FUTURE U-SPACE ENVIRONMENT

RPAS WITHIN CIVIL AIR TRAFFIC

Integrating drones in civil air traffic other than in segregated airspace



DSNA and the French Air Force are very much involved in the integration of medium altitude long endurance drones (MALE) in civil air traffic other than in segregated airspace. This new generation of unmanned aircraft system will become, in the short term, a real operational challenge for overall performance of air traffic management.

Both authorities led live trials with the new military REAPER drone in the upper airspace of Bordeaux ACC in July 2018. The picture above shows a crossroad with the flight KLM at FL 190. This drone has performances equivalent to those of regional aircraft.

The results obtained will be shared with the EASA, the European Agency for Safety Aviation, in charge of establishing the future regulations in this matter.

PODIUM

Proving Operation of Drones with Initial UTM Management



In 2019, in the framework of the PODIUM project, U-space demonstrations for visual-line-of-sight (VLOS) and beyond-visual-line-of-sight (BVLOS) flights were performed at five operational sites in Europe : France (the Drones Paris Région cluster in Brétigny-sur-Orge and at Rodez airport), Denmark and the Netherlands.

This Research project coordinated by EUROCONTROL aimed to assess the maturity of U-space services solutions in some pre-defined operational scenarios and environments. PODIUM stakeholders have implemented 18 VLOS and BVLOS operational scenarios. 73 demonstration flights were carried out and 138 flight authorisation workflows were processed. DSNA mainly collaborated in the evaluation of advanced U-space services developed by Airbus.

The conclusions of the project demonstrate the interest of highly automated solutions, which reduces the workload both on ATC and the drone operator side, and for tools providing situational awareness. Finally, the technical feasibility of the proposed solutions has been confirmed for the flight preparation and strategic phase, but still needs to be consolidated regarding the tactical phase (U2 and U3 services).

SESAR 2020 Project

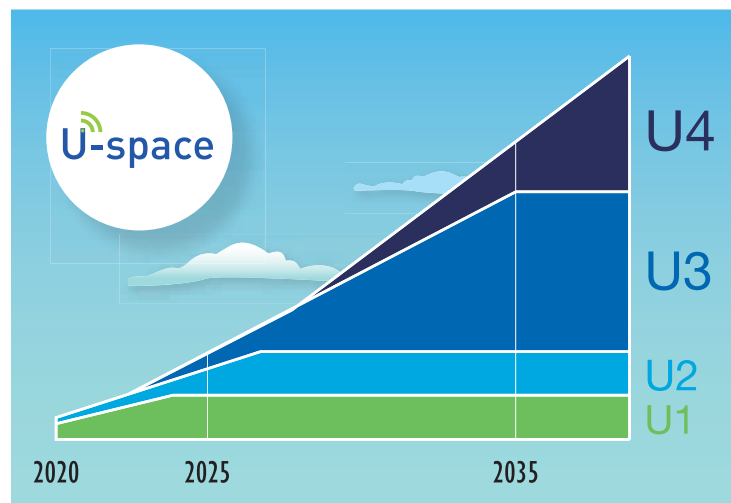
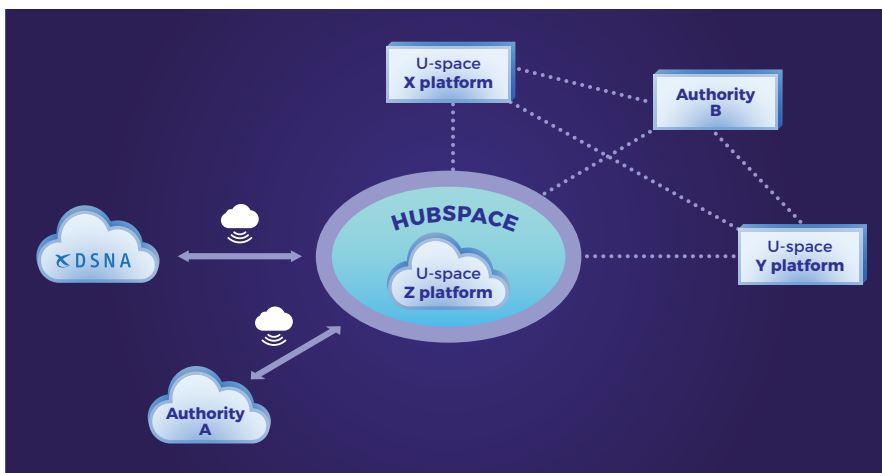


This project has received funding from the SESAR Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement 783230.

A MID-TERM VISION OF THE USE OF AIRSPACE WITH INTEGRATED ATM AND U-SPACE SERVICES

Air traffic control is provided by Air Navigation Service Providers within controlled airspace.

UTM services are provided **by U-Space Service Providers (USSP)**. The required interface with ATM is provided by SWIM services. By 2023, U-space will evolve through a digital, decentralised and structured infrastructure. The digital platform called **the Hubspace** will enable communications between DSNA, U-Space platforms and Authorities through cloud and interoperability services.



The U-Space vision was introduced by the European Commission. It covers the ecosystem of services and specific procedures necessary for reliable, safe and efficient drone operations. A U-space service provision regulation shall be required.

- U1 Basic services** (e-registration, e-identification)
- U2 Initial services** (flight planning, authorization and tracking)
- U3 Advanced services** (dynamic airspace management)
- U4 Full services** (digital, automatized and interconnected operations)

DEVELOPING A BALANCED APPROACH TO KEEP A SUSTAINABLE SKY

Emergency and rescue operations benefit greatly from drone technology. By flying with complex cameras over solar power plants, building sites, wind farms, lands and fields, engineers and farmers can monitor and optimize maintenance and production processes and thus reduce waste.

Drones, which require little infrastructure and consume little or no fuel, are also more and more used to combat environmental

offenders, and thus to protect the environment. DSNA supports and promotes drone initiatives that contribute significantly to sustainable development.

At the same time, large scale drone operations may impact safety, security, privacy and generate noise. In that respect, urban-air-mobility will be an important challenge. DSNA is specifically vigilant concerning drone impact on the Environment and



aims at sustainable balance in terms of social acceptance of drone applications.



UAS operations can support public interest missions: emergency services such as firefighters, maritime surveillance



UAS operations in non-urban and urban areas: railway surveillance; commercial parcel delivery drone “Skyways”

ACRONYMS

ATM

Air Traffic Management

AIS

Aeronautical Information Services

B-VLOS

Beyond VLOS

eVTOL

electric Vertical Take-off and Landing

RPAS

Remotely Piloted Aircraft System

SESAR

Single European Sky ATM Research

SWIM

System-Wide Information Management

UAV

Unmanned Aerial Vehicle

UAS

Unmanned Aircraft System

USSP

U-space Service Provider

U-space

UAS space

UTM

UAS Traffic Management

VLL

Very Low Level

VLOS

Visual Line Of Sight
